CLAIMS

1. A process for producing a phosphorus heterocyclic dimer comprising reacting, in the presence of a base, primary phosphine represented by formula (1):

[Chem. 1]

(1)

(wherein R represents a linear, branched, or cyclic alkyl group having 2 to 20 carbon atoms) with a compound represented by formula (2):

[Chem. 2]

(2)

(wherein Y represents a halogen atom or a leaving group selected from -OTs, -OTf, and -OMs, and n represents a number of 3 to 6); reacting the product with boron trihydride, oxygen, or sulfur to obtain a phosphorus heterocyclic compound represented by formula (3):

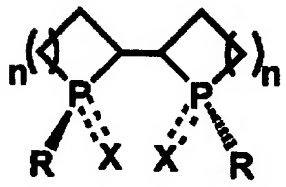
[Chem. 3]

(3)

(wherein R represents the same as the above, n represents a number of 1 to 4, X represents a boron trihydride group, an oxygen atom, or a sulfur atom, and === represents a single

bond when X is a boron trihydride group or a double bond when X is an oxygen atom or sulfur atom); dimerizing the resultant compound to produce a phosphorus heterocyclic dimer represented by formula (4):

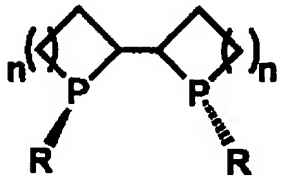
[Chem. 4]



(4)

(wherein R, n, and X represent the same as the above); and then removing oxygen, sulfur, or borane from the resultant phosphorus heterocyclic dimer to obtain an optically active phosphorus heterocyclic dimer represented by formula (5):

[Chem. 5]



(5)

(wherein R and n represent the same as the above).